REMARKS

Claims 1-8 and 10-96 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the remarks contained herein.

DOUBLE PATENTING

Claims 1, 17, 35, 47, 61, and 73 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Pat. No. 7,133,473. This rejection is respectfully traversed. **A terminal disclaimer is submitted herewith as suggested by the Examiner.** Reconsideration and withdrawal of this rejection are requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-3, 10-13, 17-21, 26-31, 35-37, 40-43, 47-52, 54-57, 61-63, 66-69, 74-76, 79-82, 89-91, and 96 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Onggosanusi (U.S. Pub. No. 2002/0196842) in view of Fang et al. (U.S. Pat. No. 5,757,834). This rejection is respectfully traversed.

In the Response of June 27, 2008, Applicants provided reasons with respect to Claim 1 why Onggosanusi and Fang do not at least show, teach or suggest: A) a dimension demultiplexer that communicates with a demodulator and that generates in-phase (I) and quadrature (Q) components of a demodulated symbol sequence that are encoded based on a space time block code and an outer code; and B) a branch metric computation module that generates branch metrics based on the I and Q components.

Thus, under the All Elements Rule, the Examiner has failed to show support for features A and B in the relied upon references. Additional reasons for the allowability of Claim 1 are provided below.

The Examiner admits that Onggosanusi does not disclose the claimed demultiplexer. As best understood by Applicants, Onggosanusi discloses decoders 110 and a channel decoder 40". The decoders 110 are used for space time block decoding. The decoder 40" is used for outer decoding. Several devices and corresponding tasks in Onggosanusi are performed between the decoders 110 and the channel decoder 40". For example, a joint interference cancellation and detector device 88', a parallel/serial device 34", a demodulator 36", and a deinterleaver 38" are connected between the decoders 110 and the channel decoder 40" in Onggosanusi.

To show disclosure of the claimed demultiplexer, the Examiner appears to allege that the demodulator 36" and the channel decoder 40" of Onggosanusi may be replaced with a demodulator 10 and a Viterbi decoder 15 of Fang. The Examiner states that the demodulator 10 of Fang provides I and Q components. Applicants submit that this is irrelevant. The signal received by the demodulator 36" is not space time block encoded. The signal received by the demodulator 36" is based on the output of the decoders 110. Since the decoders 110 decode a space time block code, the output of the decoders 110 is not space time block encoded. As such, should the demodulator 36" of Onggosanusi be replaced with the demodulator 10 of Fang, the output of the demodulator 10 would not be space time block encoded. Also, Fang only discloses outer decoding, not inner decoding. Thus, the replacement of the demodulators of

Onggosanusi and Fang would not generate space time block encoded I and Q components, as claimed.

For at least the above reasons, the combination of Onggosanusi and Fang does not provide a demultiplexer that generates I and Q components, which are encoded based on a space time block code and an outer code. It is a longstanding rule that to establish a prima facie case of obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 143 (CCPA 1974), see MPEP § 2143.03.

Therefore, Claim 1 is allowable for at least the above reasons and regardless of whether joint decoding is recited in the claim. Claims 35 and 61 are allowable for at least similar reasons. Claims 2-8, 10-16, 36-46, 62-72, 84-94 and 96 ultimately depend from Claims 1, 35 and 61 and are allowable for at least the same reasons.

In maintaining the rejection of Claims 1-8, 10-16, 35-46, 61-72, 84-94 and 96, the Examiner alleges that joint decoding is not recited in the claims. Applicants submit that Claim 96 does recite joint decoding. This feature of Claim 96 appears to have been overlooked by the Examiner. Nevertheless, the recitation of joint decoding is irrelevant. The claims recite features that enable, begin and/or facilitate joint decoding. These features are not disclosed in Onggosanusi, Fang and/or a combination thereof. For example, Claim 1 recites features A and B. Features A and B are not disclosed by the relied upon references.

Also, features A and B are beginning steps of a joint decoding process. Note that the claimed I and Q components are encoded based on a space time block code

and an outer code. The separation of a demodulated symbol sequence (jointly encoded signal) into space time block encoded I and Q components allows a branch metric computation module to generate one-dimensional branch metrics based respectively on each of the I and Q components. A Viterbi decoder may than determine a most likely received sequence based on the one-dimensional branch metrics. The one-dimensional branch metrics are used instead of multi-dimensional branch metrics, which are common when performing separate decoding of space time block encoded and outer encoded signals. The use of one-dimensioned branch metrics reduces the computation complexity involved in the decoding process performed by, for example, a Viterbi decoder. See paragraph [0033] of the present application. Onggosanusi and Fang do not disclose steps of a joint decoding process.

The Examiner further alleges that joint decoding is not adequately described in the specification of the present application. Applicants respectfully disagree. In paragraphs [0007] and [0008] of the present application, separate decoding of space time block encoded and outer encoded signals is described. In paragraph [0028], an example demodulated symbol sequence after passing through a channel is shown as expression A. Joint decoding is mentioned in paragraph [0028] and then is described at least in paragraphs [0030]-[0034]. Paragraph [0030] describes the generation of I and Q components for symbols that are space time block encoded and outer encoded.

Paragraph [0033] provides example one-dimensional branch metrics, describes how the one-dimensional branch metrics are determined based on the I and Q components, and describes the use of a Viterbi decoder to determine a most likely

sequence based on the one-dimensional branch metrics. The joint decoding process includes the generation of the I and Q components, the generation of the one-dimensional branch metrics, and the determining of decoded symbols based on the one-dimensional branch metrics. Thus, an adequate description is provided in the specification of the present application for joint decoding.

Thus, Claims 1-8, 10-16, 35-46, 61-72, 84-94 and 96 are further allowable for at least the above reasons.

The Examiner further alleges that when phase shift keying (PSK) is used, some mechanism (such as a demultiplexer) must be utilized for quadrature demodulating a signal to provide I and Q components. PSK may be used by an outer encoder when encoding a symbol sequence. Outer encoding is independent of space time block encoding. Likewise, outer decoding is typically independent of space time block decoding, as shown and described in Onggosanusi. Thus, regardless of whether it would have been obvious to use a demultiplexer to generate I and Q components when performing outer decoding for PSK modulated signals, it would not have been obvious to use a demultiplexer to generate I and Q components for a jointly encoded signal. Onggosanusi and Fang do not disclose joint decoding or performing I and Q separation of jointly encoded signals.

Thus, Claims 1-8, 10-16, 35-46, 61-72, 84-94 and 96 are further allowable for at least the above reasons.

With respect to Claim 17, Applicants have shown that Onggosanusi and Fang at least show teach or suggest a branch metric computation module that generates branch metrics based on separated I and Q components that are encoded based on a space time block code and an outer code. Thus, the Examiner has failed to show support in the relied upon references for each and every feature of Claim 17.

In maintaining the rejection of Claims 17-34, 48-60, 72-88 and 95, the Examiner alleges: I) that Onggosanusi and Fang disclose the claimed features; and II) that since a demodulated sequence is based on a received signal, which is space time block encoded and outer encoded, the components of the demodulated sequence after being quadrature split would be a signal based on a space time block code and an outer code.

With respect to item I, the Examiner admits that Onggosanusi does not disclose a branch metric computation module. The Examiner alleges that Fang discloses a branch metric computation module. As best understood by Applicants, Fang discloses a branch metric computation module 16 that generates branch metrics based on I and Q signals, which are encoded based on an outer code and not based on a space time block code. Thus, Onggosanusi and Fang fail to disclose each and every limitation of Claim 17.

With respect to item II, the reasoning provided by the Examiner appears to be illogical and/or irrelevant. The Examiner appears to allege that the I and Q components of a demodulated sequence are based on a space time block code and an outer code when a received signal that is demodulated is space time block encoded and outer encoded. The Claims recite that separated in-phase and quadrature components <u>are encoded based on a space time block code and an outer code</u>. The Claims do not

recite that the separated in-phase and quadrature components are generated based on a space time block encoded and an outer encoded signal.

In Onggosanusi, a received signal is space time block decoded by the decoder 110 before being passed to the demodulator 36" and the outer decoder 40". The replacement of the demodulator 36" and the decoder 40" with the demodulator 10 and the decoder 15 of Fang does not change the output of the decoders 110 of Onggosanusi. Thus, the output of the demodulator 10 of Fang as combined with Onggosanusi provides I and Q components that are not space time block encoded, but rather are generated based on a demodulator received signal that is space time block decoded. Also, the branch metric computation of Fang is not based on space time block encoded I and Q components. In contrast, the claimed branch metric computation module generates branch metrics based on space time block encoded I and Q components.

Therefore, Claim 17 is allowable for at least the above reasons. Claims 47 and 73 are allowable for at least similar reasons. Claims 18-34, 48-60, 72-88 and 95 ultimately depend from Claims 17, 47 and 73 and are allowable for at least the same reasons.

ALLOWABLE SUBJECT MATTER

The Examiner states that claims 92-94 would be allowable if rewritten in independent form. Claims 92-94 ultimately depend from Claim 1 and are allowable as drafted for at least the same reasons as Claim 1. Applicants reserve the right to amend Claims 92-94 into their originally allowable form at a later date if needed.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: December 16, 2008

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